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Magnetic Resonance Imaging Findings of Craniofacial Fibrous Dysplasia

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There have been few reports in the literature concerning the magnetic resonance imaging (MRI) appearances of fibrous dysplasia. We reviewed MRIs of 4 patients with craniofacial lesions. Using a 1.5-T Signa Unit (General Electric, Milwaukee, WI), both T1- and T2-weighted MRI scans were performed. In our 4 patients, the fibrous dysplastic lesions were characterized by a decreased signal on both T1- and T2-weighted images. And all lesions had sharply demarcated borders. The fine image of fibrous dysplasia by MRI is extremely useful, not only as a diagnostic aid, but also as an invaluable guide to surgery.

Yano M, Tajima S, Tanaka Y, Imai K, Umebayashi M. Magnetic resonance imaging findings of craniofacial fibrous dysplasia. Ann Plast Surg 1993; 30:371–374

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Patient Reports

Patient 1

A 33-year-old man presented with hemifacial swelling caused by fibrous dysplasia. His cosmetic appearance was markedly improved by contour-restoring surgery 3 years previously, but fibrous dysplastic lesions still remained.

In the scintigraphy, fibrous dysplasia was detected on the left hemifacial region (Fig 1). In the Waters' view radiograph, this region was detected as having a frosted glass-like appearance with an unclear border (Fig 2). In the computed tomographic (CT) scan, bony thickening was noted in the frontal region on the slice 60 mm above the orbitomeatal base line, but the border between the normal bone and the affected bone was unclear (Fig 3).

On magnetic resonance imaging (MRI) scanning, a coronary T1-weighted image clearly identifies the site of fibrous dysplasia as a low signal intensity area (Fig 4). On T2-weighted images, the affected bone is inhomogeneous, with a spotted high signal intensity area, which seems to indicate the cystic change (Fig 5). On sagittal section, fibrous dysplasia spreads over the frontobasal area (Fig 6).

Patient 2

A 9-year-old girl had a swelling of the left side of her forehead. On both T1- and T2-weighted images, fibrous dysplasia was detected as a low signal intensity area that was homogeneous with no spotted area (Figs 7, 8).

Summary of Four Patient Reports

The MRI appearances of our 4 patients are summarized in Table 1. All lesions were characterized by sharply demarcated low signal intensity areas on both T1- and T2-weighted images, whereas scintigraphy, radiography, or CT scan findings of the lesions do not show distinct boundaries.

In Patients 1, 3, and 4, the affected bone involved a spotted high signal area and looked inhomogeneous. Only in Patient 2 did no such spot exist and the bone look homogeneous.

Discussion

Diagnostic imagings of fibrous dysplasia have been well described by means of scintigraphy, radiography, and CT. But it has been difficult to detect the fibrous dysplastic lesion as a sharply bounded image. We have found sharply demar-

Fig 1. Scintigraphy of Patient 1. Fibrous dysplasia is detected on the left hemifacial region.

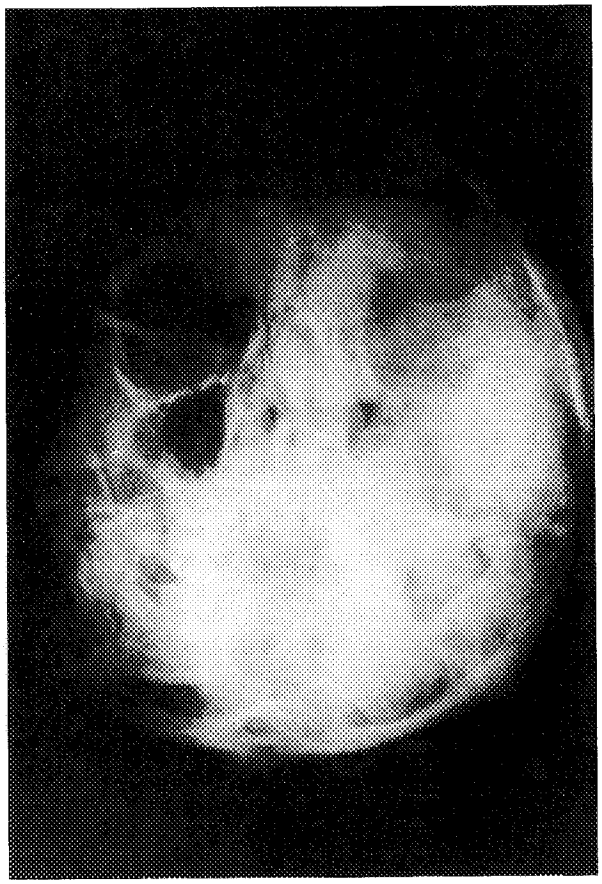

Fig 2. Water's view radiograph of Patient 1. The affected bone is detected as frosted glass-like in appearance with an unclear border.

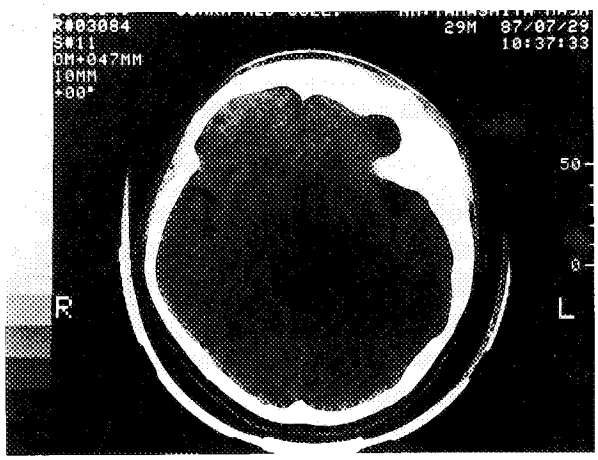

Fig 3. Computed tomographic scan of Patient 1. Bony thickening is noted in the frontal region.

cated images of fibrous dysplasia by MRI examination, which is useful not only as a method of diagnosis but also as a guide to surgery. It is particularly useful, when the orbital apex is involved, to know whether compression of the optic nerve is imminent. If such is the case, the clear image of this area by MRI scanning is quite useful (Fig 9).

MRI appearances of fibrous dysplasia have been previously described in the literature by Norris and colleagues [1] and Utz and co-workers [2]. Their 24 patients (17 long bone, 6 pelvis, 1 cranium) are summarized in Table 2.

It is known that fibrous tissues such as tendon and postoperative scar tissue show low signal intensity on T1- and T2-weighted images. On the other hand, fibrous dysplasia show various signal intensities on T2-weighted images. All 4 patients with craniofacial lesions showed low signal intensity on T2-weighted images. We suppose that water content owing to histology, metabolic activity, proliferating ability, and age would deter-

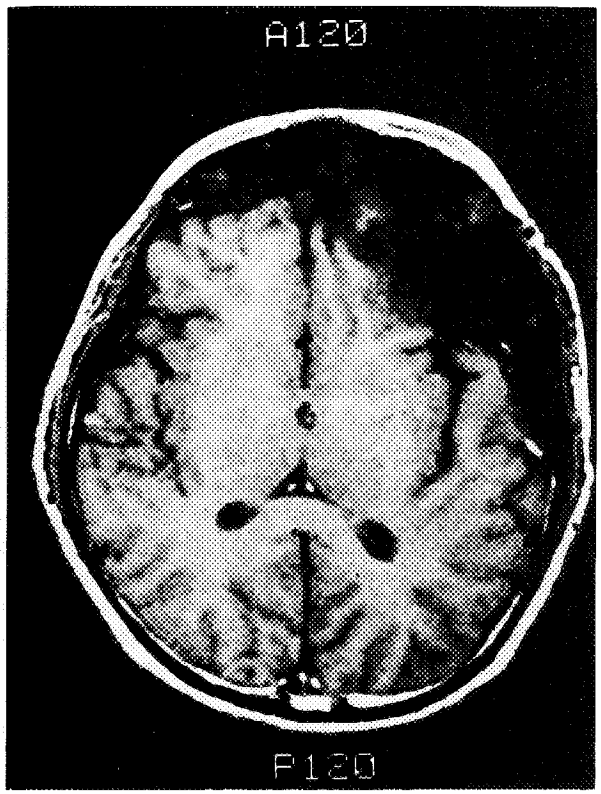

Fig 4. T1-weighted image of Patient 1. Fibrous dysplastic bone is identified as a low signal intensity area with sharply bounded border.

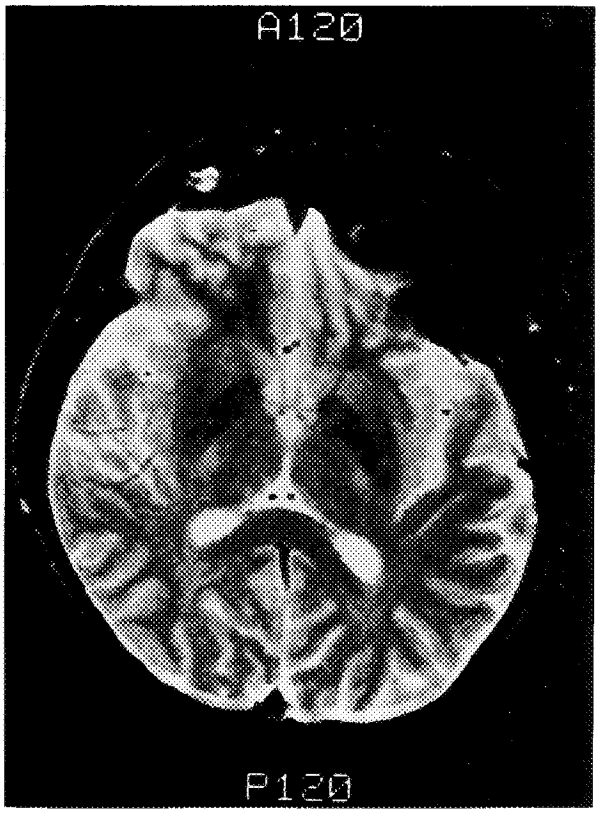

Fig 5. T2-weighted image of Patient 1. Affected bone shows low signal intensity.

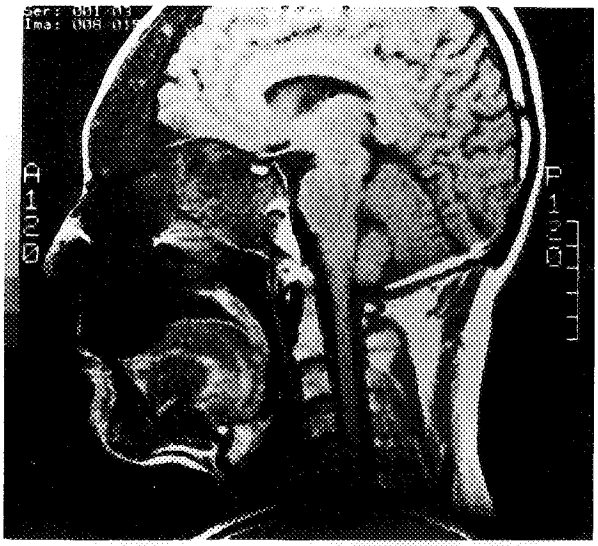

Fig 6. Sagittal section of Patient 1 (T1-weighted image).

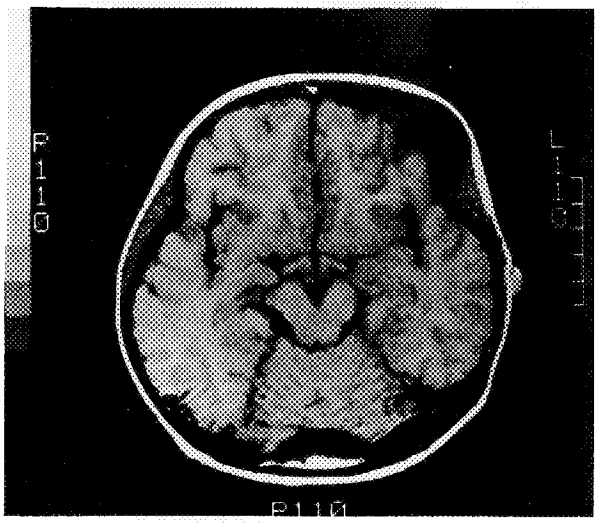

Fig 7. T1-weighted image of Patient 2. Affected bone shows low signal intensity.

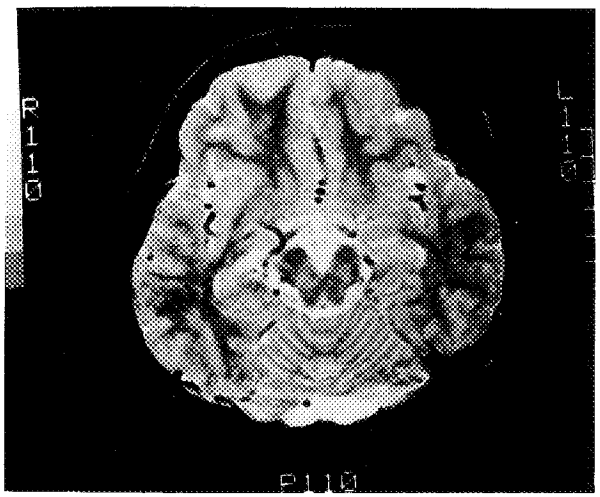

Fig 8. T2-weighted image of Patient 2. Affected bone shows low signal intensity.

Table 1. Summary of Magnetic Resonance Imaging

Patient No.	Age (yr)/Sex	T1	T2
1	33/M	Low SI, inhomogeneous	Low SI, inhomogeneous
2	9/F	Low SI, homogeneous	Low SI, homogeneous
3	22/M	Low SI, inhomogeneous	Low SI, inhomogeneous
4	17/M	Low SI, inhomogeneous	Low SI, inhomogeneous

SI = signal intensity.

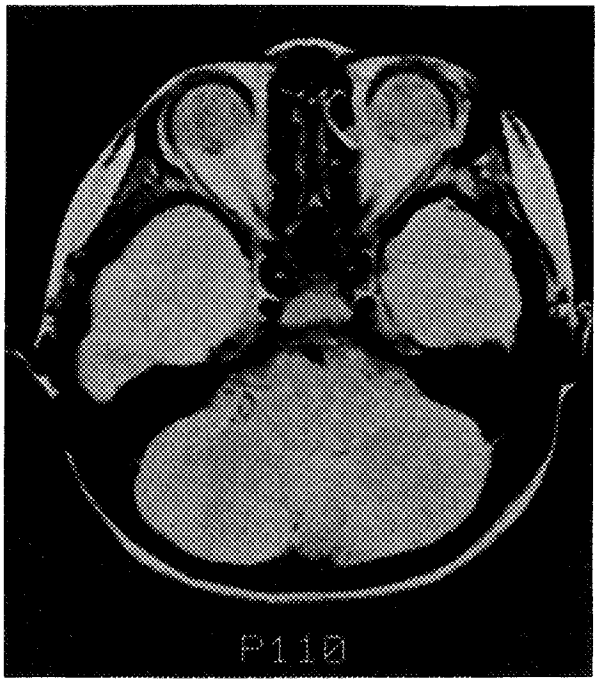

Fig 9. T2-weighted image of Patient 2 on the slice corresponding to the optic canal. That there is no compression on the optic nerve is clearly shown.

Table 2. Magnetic Resonance Imaging Appearance of Fibrous Dysplasia[a]

	T1	T2
Signal Intensity		
High[b]	0	13
Intermediate[c]	0	2
Low[d]	24	9
Total	24	24

[a]Adapted from [1] and [2].
[b]Higher than subcutaneous fat.
[c]Isointense with skeletal muscle.
[d]Lower than skeletal muscle.

mine the MRI appearances of fibrous dysplasia. Though the correlation of histology and MRI appearance is unclear, the sharp demarcation evident with MRI scanning is extremely useful.

References

1 Norris MA, Kaplan PA, Pathria M, et al. Fibrous dysplasia: magnetic resonance imaging appearance at 1.5 Tesla. Clin Imag 1990;14:211
2 Utz JA, Kransdorf MJ, Jelinek JS, et al. MR appearance of fibrous dysplasia. J Comput Assist Tomogr 1989;13:845